



Shafts

Standard & Precision Type / Both Ends Stepped & Tapped with Wrench Flats

Shafts – Standard & Precision Type / Both Ends Stepped & Tapped with Wrench Flats



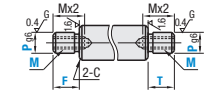
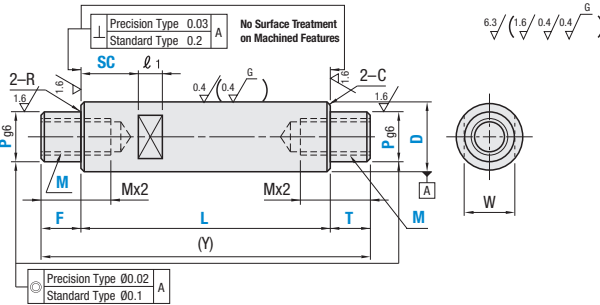
RoHS 10

- Annealing caused by machining wrench flats and shaft end threading (thread effective length + approx. 10 mm) may lower hardness. P.199
- Circularity, Straightness, Perpendicularity, Concentricity and Changes in Hardness. P.198
- Features of Low Temperature Black Chrome Plating P.213.
- For Shafts without Wrench Flats, see P.250.

Precision Type	Type			Material	Hardness	Surface Treatment
	D Tol. g6	D Tol. h5	D Tol. f8			
VFPH	SFPH	SFHU	—	52100 Bearing Steel Equivalent	Effective Hardened Depth of Induction Hardened P.199	—
VSPFH	SSFPH	SSFHU	—	SUS440C (13Cr) Stainless Steel Equivalent		
VPPFH	PSFPH	PSFHU	—	52100 Bearing Steel Equivalent	52100 Bearing Steel Equivalent 58 HRC min.	Hard Chrome Plating Plating Hardness: 750 HV min. Plating Thickness: 5 μ or More
VPSFPH	PSSFPH	PSSFHU	—	SUS440C (13Cr) Stainless Steel Equivalent	SUS440C (13Cr) Stainless Steel Equivalent 56 HRC min.	
VRPH	RSFPH	—	—	52100 Bearing Steel Equivalent	—	Low Temperature Black Chrome Plating
VSRPH	—	—	—	SUS440C (13Cr) Stainless Steel Equivalent	—	
—	—	—	PFPGH	1045 Carbon Steel Equivalent	—	Hard Chrome Plating Plating Hardness: 750 HV min. Plating Thickness: 10 μ or More
—	—	—	PSFPGH	304 Stainless Steel	—	

D Tolerance			
D	g6	h5	f8
8	-0.005	0	-0.013
10	-0.014	-0.006	-0.035
12	—	—	—
13	—	—	—
15	-0.006	0	-0.016
16	-0.017	-0.008	-0.043
18	—	—	—
20	-0.007	0	-0.020
25	-0.020	-0.009	-0.053
30	—	—	—
35	-0.009	0	-0.025
40	-0.025	-0.011	-0.064
50	—	—	—

Features of Precision Shafts
Concentricity is $\square 0.02$
Perpendicularity is $\square 0.03$



Precision shafts have grinding undercuts at stepped sections (max. width 1 mm / max. depth 0.1 mm).

Part Number	1 mm Increment				M (Coarse Threads)	Wrench Flats Dimensions			(Y) Max.	R	C
	Type	D	L	F / T		P	SC	W			
Precision Type D Tolerance g6 VFPH VSPFH VPPFH VPSFPH VRPH VSRPH	8	25-296	2 ≤ F ≤ Px4 2 ≤ T ≤ Px4	6	3	SC=1 mm Increment SC+ℓ1 ≤ L SC=0 Details of Wrench Flats P.199	7	8	300	0.5 or Less	0.2 or Less
	10	25-346		6-8	3 4 5		8	350			
	12	25-346		6-10	3 4 5 6		10	350			
	13	25-346		6-11	3 4 5 6 8		11	350			
	15	25-346		6-13	3 4 5 6 8 10		13	350			
	16	25-346		6-14	3 4 5 6 8 10		14	350			
	18	25-346		8-16	4 5 6 8 10 12		16	350			
	20	25-446		8-17	4 5 6 8 10 12		17	450			
	25	25-446		8-22	4 5 6 8 10 12 16		22	450			
	30	25-446		9-27	5 6 8 10 12 16 20 24		27	450			

- P dimensions require M+3≤P.
- Total length (Y) requires Mx4≤(Y).
- When (Mx2.5+4)x2≥(Y), tap pilot holes may go through.

Part Number	1 mm Increment				M (Coarse Threads)	Wrench Flats Dimensions			(Y) Max.	R	C
	Type	D	L	F / T		P	SC	W			
Standard Type D Tolerance g6 SFPH SSFPH PSFPH PSSFPH RSFPH (D≤30, L≤500) D Tolerance h5 SFHU SSFHU PSFHU PSSFHU D Tolerance g6 8 ≤ D ≤ 30 D Tolerance g6 D ≥ 35 D Tolerance f8/h5 2 ≤ F(T) ≤ Px5 2 ≤ F(T) ≤ Px4	8	25-1096	2 ≤ F(T) ≤ Px5 2 ≤ F(T) ≤ Px4	6	3	SC=1 mm Increment SC+ℓ1 ≤ L SC=0 Details of Wrench Flats P.199	7	8	1100	0.5 or Less	0.3 or Less
	10	25-1196		6-8	3 4 5		8	1200			
	12	25-1396		6-10	3 4 5 6		10	1400			
	13	25-1396		6-11	3 4 5 6 8		11	1400			
	15	25-1396		6-13	3 4 5 6 8 10		13	1400			
	16	25-1396		6-14	3 4 5 6 8 10		14	1400			
	18	25-1396		8(7)-16	4 5 6 8 10 12		16	1400			
	20	25-1396		8(7)-17	4 5 6 8 10 12		17	1400			
	25	25-1396		8(7)-22	4 5 6 8 10 12 16		22	1400			
	30	25-1496		9(8)-27	5 6 8 10 12 16 20 24		27	1500			
	35	25-1496		9-32	5 6 8 10 12 16 20 24		30	1500			
	40	25-1496		11-37	6 8 10 12 16 20 24 30		36	1500			
	50	25-1496		11-47	6 8 10 12 16 20 24 30		41	1500			

- P() dimensions are applicable only for D diameter tolerance with g6.
- P dimensions require M+3≤P.
- Total length (Y) requires Mx4≤(Y).
- When (Mx2.5+4)x2≥(Y), tap pilot hole may go through.

Shafts

Standard & Precision Type / Both Ends Stepped & Tapped with Wrench Flats, *continued*

Part Number Example
Part Number - L - F - P - M - T - SC
VFPH20 - 300 - F25 - P16 - M10 - T20 - SC10
SFPH20 - 400 - F25 - P16 - M10 - T20 - SC10

Part Number Alterations
Part Number - L - F - P - M - T - SC - (LKC...etc.)
SFPH20 - 400 - F25 - P16 - M10 - T20 - SC10 - LKC

Alteration Details P.200

Alterations	Code	Spec.
	LKC	Alteration to L Dimension Tolerance Ordering Code: LKC Application Notes: Applicable when L=200 or less for precision type. ⊗ Not applicable when D-P≤2 L dimensions can be specified in 0.1 increments for LKC. Ⓛ L<200 → L±0.03 200≤L<500 → L±0.05 L≥500 → L±0.1
	SX	Second Set of Wrench Flats Ordering Code: SX15 SX=1 mm Increment Ⓛ SC+SX+ℓ1x2<L Ⓛ SX=0 ⊗ Orientation between set screw flats is random.
	FC	Set Screw Flat at One Location Ordering Code: FC10-E8 Application Notes: ⊗ Not applicable to precision shafts FC, E=1 mm Increment. Ⓛ FC≤3xD Ⓛ When 1.5xD<FC, FC≤L/2 Ⓛ E=0 or E≥2 ⊗ Not available in combination with WFC.
	WFC	Set Screw Flats at Two Locations Ordering Code: WFC8-A8-E4 Application Notes: ⊗ Not applicable to precision shafts Specify WFC, A and E=1 mm Increment Ⓛ WFC≤3xD Ⓛ When 1.5xD<FC, 2WFC≤L/2 Ⓛ A (E)=0 or A (E)≥2 ⊗ Orientation between set screw flats is random. Not available in combination with FC.

Alterations	Code	Spec.
	RC	90° Set Screw Flat at One Location Ordering Code: RC10 Application Notes: Only applicable to D=10-30 ⊗ Not applicable to precision shafts ⊗ Not available in combination with WRC For details, see Shaft Alteration Overview, P.200.
	WRC	90° Set Screw Flats at Two Locations Ordering Code: WRC10-Y10 Application Notes: Only applicable to D=10-30 ⊗ Not applicable to precision shafts ⊗ Not available in combination with RC. ⊗ Orientation between set screw flats is random. For details, see Shaft Alteration Overview, P.200.
	KC	Keyway at one location: KC
	WKC	Keyways at two locations: WKC
	MD	Change the effective tap depth to Mx3. Ordering Code: MD6 (M is changed to MD) Application Notes: Only applicable to D=10-30 and M=6-20 Ⓛ One End Tapped: MDx3.5+4≤L ⊗ Not available combination with KC, WSC.
	LFC RFC	Set Screw Flat at Step Parts Ordering Code: LFC10-A0 RFC10-E0 Ⓛ LFC(RFC)+A(E)≤F(T) Ⓛ D-M≥1 ⊗ Orientation between two set screw flats is not coplanar.

- Alteration Details P.200
- Please see Shaft Alteration Overview for details if provided. P.200
 - When selecting multiple alteration additions, the distance between machined areas should be greater than 2mm. P.201
 - Alterations may lower hardness. P.199